Attachment A - Transportation Analysis

Transportation and Traffic

General Background: SouthLake Union is a major traffic generator of vehicular trips due to the auto oriented nature of businesses in the area and a maj or recipient of pass-through trips owing to its connection to regional links (I-5 and Aurora) for surrounding neighborhoods and activities (e.g. Seattle Center). Within the neighborhood, all traffic is handled on conventional city streets, a few of which are designated as arterials.

East/west traffic is served by two corridors, Denny Way along the neighborhood's southern boundary and the Mercer/Valley corridor at the south end of Lake Union. Denny Way connects to I-5 southbound and serves not only South Lake Union but also Lower Queen Anne, Denny Triangle, Belltown and the Waterfront. The Mercer/Valley couplet connects to both North and South I-5 and serves Queen Anne, Magnolia, Fremont, portions of Ballard, Denny Triangle and Belltown and is one oftwo options to get around Lake Union. Both of these corridors are extremely congested and operate at or beyond capacity several hours a day and during major Seattle Center events.

North/south traffic is somewhat better served owing in-part to the parallel flows of I-5 and SR99 (Aurora) and in part to the fact that four arterials carry internal flows. The Dexter Avenue corridor carries traffic and bicycles from downtown to the north end of Queen Anne and is generally free-flowing. Westlake Avenue and 9th Avenue (one-way couplets) also serves from downtown to North Queen Anne and, except where they cross Mercer, are generally free-flowing. The Eastlake corridor is on the eastern edge of the neighborhood and connects from downtown to Eastlake and the University District. It is generally free-flowing. The forth corridor, Fairview Avenue, connects from downtown to Eastlake and is impacted at crossings with Denny Way and Mercer Avenue. Congestion around the Mercer ramps to I-5 is the most problematic situation.

Traffic growth will undoubtedly continue on streets in South Lake Union. This will not occur so much due to new development, as the service area is generally built out, but rather to redevelopment as less intensive uses are replaced by more intense uses. This will occur in South Lake Union, as well as, Lower Queen Anne, Denny Triangle and Belltown.

Transit has not been a significant factor in serving trips to and from South Lake Union.. While several routes do traverse the neighborhood, they area not coordinated to serve the neighborhood. Until recently parking has always been available and probably served as a disincentive to transit use.

Parking Parking dynamics vary widely within the neighborhood, and it has only been in the past few years that a noticeable problem has surfaced. South Lake Union has enjoyed free on-street parking and benefited from numerous low cost surface parking lots scattered throughout the neighborhood. The first area to feel the pressure was the Waterfront where numerous successful area restaurants and businesses have taxed the limited supply. The second area to feel the pressure was Cascade, where a recent zoning change allowed residential development to be constructed without any parking requirements. This has upset the delicate balance that existed between area businesses and residents as they shared the available parking supply. Nowtbere is extreme competition for parking that is detrimental to area businesses.

Elsewhere," in the greater neighborhood, surface parking lots are being converted for new development as South Lake Union experiences the development boom in Seattle. These lots serve mainly employees of the area businesses. In the absence of any strategy to replace the lot spaces or provide alternate access, it is unclear what business decisions will be made to address this situation

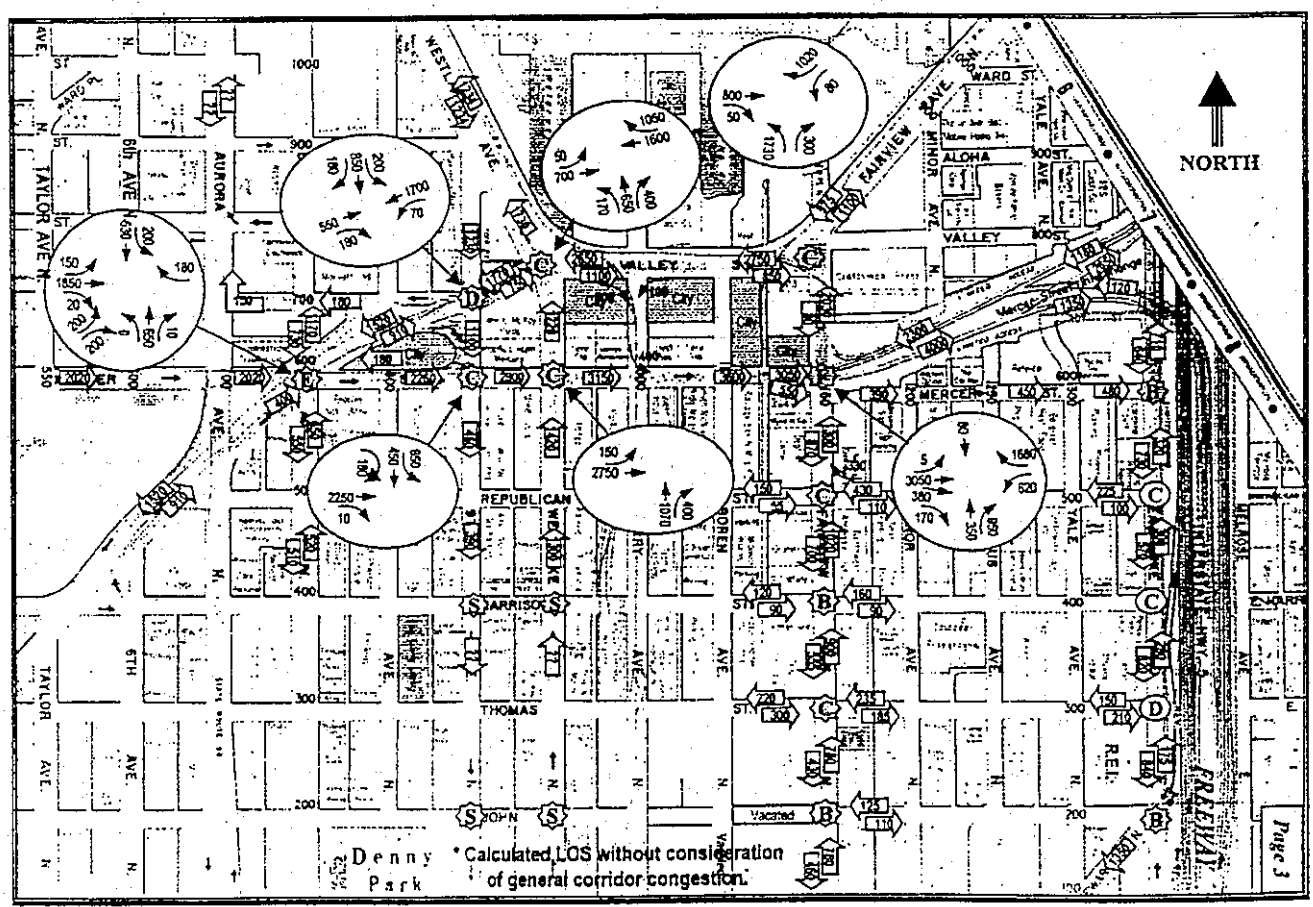
Mercer/Valley: When Interstate 5 through downtown Seattle opened during the mid- 1960s, Mercer Street west of I-5 took on a whole new service function. It became the regional access connection to/from I-5 for

Queen Anne Hill, the lower Queen Anne business district, and the new Seattle regional recreational center site that evolved from the 1962 World's Fair. But a major corridor improvement was in the making - known as the Bay Freeway. The Bay Freeway would provide an expressway connection between I-5 and a planned extension of the Alaskan Way Viaduct – then known as the Northwest Expressway to Ballard and beyond.

As planning for the Bay Freeway dragged on over tie, an interim improvement was implemented that resulted in the Mercer/Valley-Broad "couplet" that still operates today. Attempts to implement the Bay Freeway concept, in whole or in part, have failed including scaled back version contained in the "Commons" proposal of 1994/95.

Subsequent studies appear to have failed to accurately redefine the fiction of the Mercer traffic corridor, The prevailing belief has been that the primary corridor function is to carry traffic between I-5 asrd areas west of Aurora Avenue - most notably the Seattle Center, Queen Anne, and Demy Regrade areas (via Broad Street in the latter case). There is also a beliefthatAurora Avenue needs to be connected to I-5 via the Mercer corridor. These functions in fact do not constitute the majority of existing traffic use of the I-5/Mercer Street ramp system.

To understand the existing traffic functions of the Mercer-Valley corridor, one must first look at traffic counts and turning movements in the corridor service area. Figure A-1 below illustrates average weekday PMpeakhour traffic counts as best they can be assembled and adjusted from recent studies in the area. This set of



1996-7 PM Peak Hour Traffic Counts and LOS*

Figure A-1

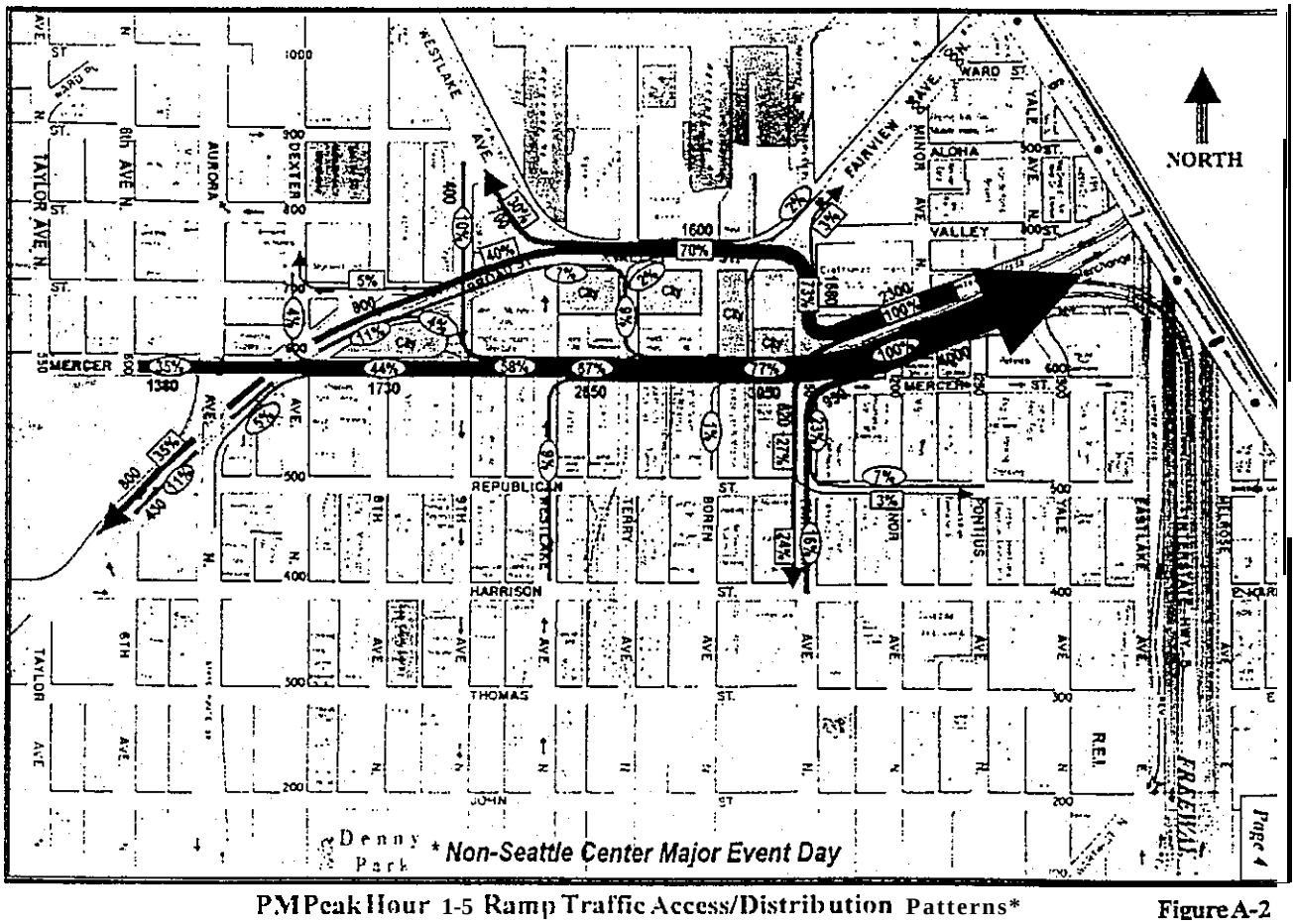
counts does not appear to reflect any major event activity at Seattle Center during the 4:3o to 5 :30pm peak hour.

During the peak hour, traffic flow is predominantly eastbound to I-5, with a total peak hour count of 4,000 vehicles on the I-5 on-ramps. The count on the Mercer Street undercrossing of Aurora Avenue is about 2,000, about one-third of which is not destined for I-5. The count on the Broad Street rmderdrossingis910, less than half of which is destined to I-5.

An estimate of PM peak hour traffic flow to/from the I-5 ramps is illustrated on Figure A-2 below. This estimate was prepared from a study of traffic turning movements along Mercer and Valley Streets.

The eastbound flow patterns may be largely characterized as trips from the corridor service area business and employment uses to homes elsewhere in the region; whereas westbound traffic flow would be characterized as trips from employment locations elsewhere to corridor service area homes.

It is estimated that less than half of all PM peak hour eastbound trips to the I-5 on-ramps come from west to Aurora Avenue (35% via Mercer, 11% via Broad). The balance of eastbound trips on the Mercer and Broad Street undercrossing of Aurora has destinations of Westlake Avenue N, Fairview Avenue N, Mercer Street to Eastlake Avenue, and within the South Lake Union community. The greater proportion of the I-5 on-ramp trips come from businesses in the South Lake Union and Denny Triangle community areas.



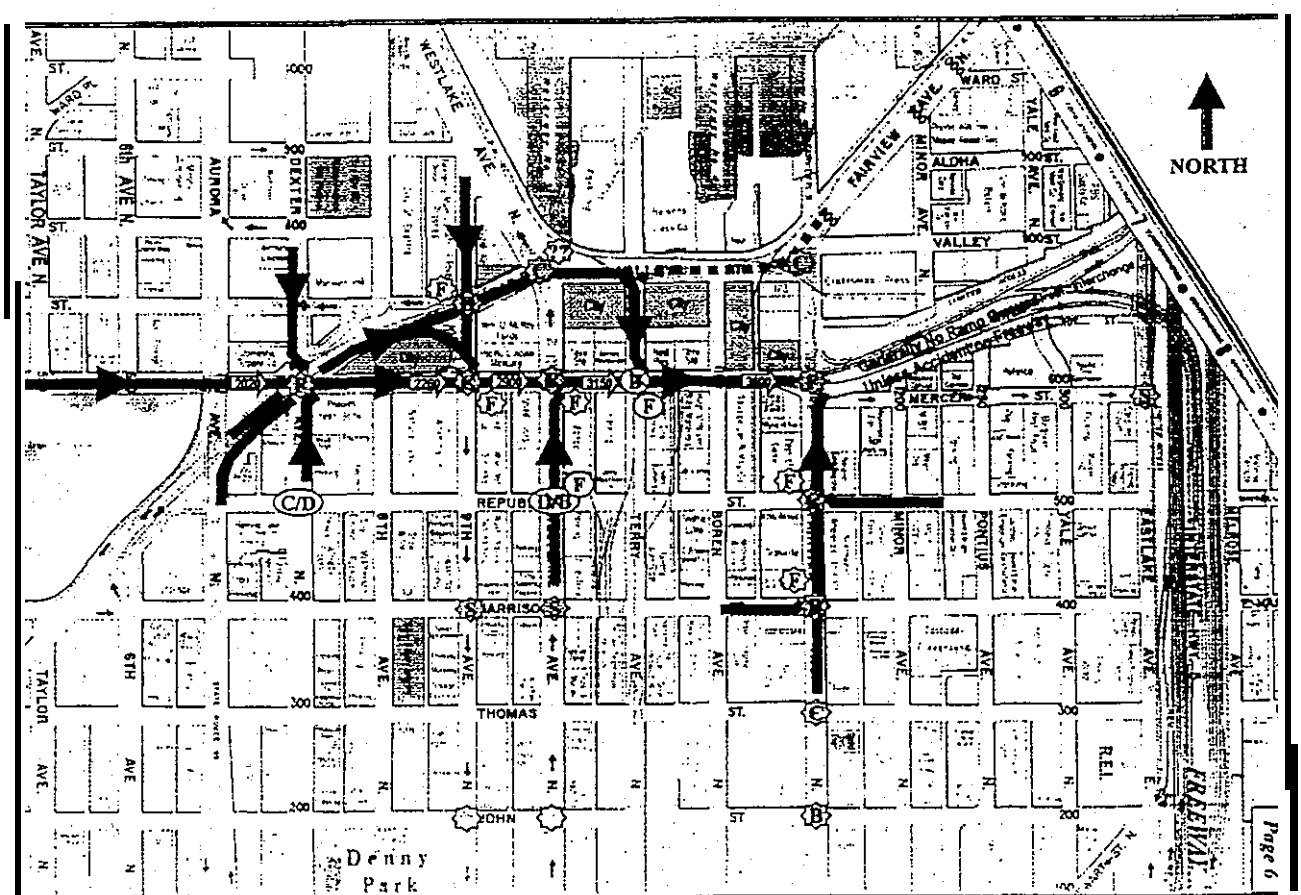
PM Peak Hour 1-5 Ramp Traffic Access/Distribution Patterns* Figure A-2

Westbound traffic volumes have an even less expected distribution pattern. Ooly about 35% are destined to areas west ofAurora - in the Mercer/Broad corridors. Another 30'70 orient northwest along Westlake Avenue. Some, of course, have destinations along Westlake Avenue. But the majority likely have some very diverse destinations in North Queen Anne, Magnolia, and perhaps even to Fremont and as far northwest as Ballard.

The current Mercer situation is a combination of severe eastbound traffic congestion along Mercer Street during afternoon hours, coupled with the convoluted routing of westbound traffic via Valley and Broad Streets.

The primary eastbound traffic "bottleneck' is the intersection of Mercer and Fairview. Figure A-3 below illustrates the traffic queues and congestion along Mercer Street and its approaches caused by the intersection The Mercer/Fairview and Mercer/Dexter intersections are calculated to operate at LOS C or better, if not influenced by the traffic backups from the Mercer/Fairview intersection. But traffic backups from the Mercer/Fairview intersections caused these intersections to appear to operate at LOS F.

The Mercer/Fairview intersection bottleneck also causes long backups south along Fairview Avenue – often extended south to Harrison Street and beyond. Hence, the Fairview intersections with Republican and Harrison frequently appear to be operating at LOS F, rather than their calculated LOS of C and B respectively. A similar situation occurs for the intersection of Republican and Westlake.



C Signalized Intersection and LOS
E/B Unsignalized LOS by Approach

PM Peak Hour LOS F Congestion Queues Created by Mercer/Fairview Intersection

Figure A-3

The intersection of Mercer/9th Avenue is often blocked, or partially blocked, by Mercer traffic; and, though signal time serving the 9th Avenue approach can be adequate, the Mercer traffic queues do not provide sufficient traffic "acceptance space." Southbound 9th Avenue traffic operations are hampered by the crossover movement from Broad to Mercer. This combination of events often causes 9th Avenue traffic queues to block, or partially block, the 9th Avenue/Valley intersection. It also causes some eastbound traffic on Broad Street destined to I-5 to make the crossover at Terry Avenue. The Mercer/Terry intersection is not signalized; therefore eastbound traffic on Mercer does not respect intersection clearance laws. This causes the Mercer/Terry intersection to operate at LOS F; and it results in some "very testy situations" caused by motorists on the Terry Avenue approach, This whole combination of events often causes traffic backups in the outer eastbound lane ofBroad Street west to its Aurora Avenue underpass or beyond.

Without resolution of the conditions causing backups on the Mercer/Valley couplet in the area from the I-5 ramps to 9th Avenue, access to and egress from South Lake Union Park and properties in the immediate corridor area will be difficult.

Through convoluted irr routing via Valley and Broad Streets as an opposing direction "couple" to Mercer Street, the westbound corridor traffic flows remarkably well – for those familiar with its operation. However, it does pose a number of traffic "weaving" and lane-change problem from the junction of the I-5 NB and SB off-ramp to Westlake Avenue. This problem is exacerbated by the 90-degree turns at Mercer/Fairview and at Fairview/Valley which limit driver foresight of lane choice decisions that must be made after each turn. Once reaching the Valley/Westlake intersection, traffic destined to areas south of Seattle Center find reasonably straightforward paths via Broad Street. However, traffic to north Seattle Center and upper/lower Queen Anne have more convolutions to negotiate —an exit to 5th Avenue at Harrison, right-turn to north on 5thAvenue across Mercer Street to Roy Street, then west on Roy Streets as the continued reverse direction "couple" with Mercer Street, When this traffic movement is exacerbated by traffic to an early everring major event at Seattle Center, it creates backups from the 5th Avenue/Harrison intersection onto Broad Street (as noted above). It further congests the 5th Avenue/Mercer "crossover" intersection% obstructing both directions of east-west traffic flow through the Mercer corridor.

Summary

Mercer/Valley Observations

- The existing traffic patterns along the Mercer corridor do not fit the former Bay Freeway paradigm, which was to devise an improvement that primarily serves traffic volumes between I-5 and areas west ofAurora. The majority of existing I-5 access trips via the Mercer ramps has origins or destinations east of Aurora Avenue.

- The primary exkdng''bottlenecl? of eastbound traffic flow on Mercer Street is the Mercer/Fairview intersection. Nearly two-thirds of all traffic affected by this bottleneck is traffic with origins and/or destinations east of Aurora Avenue in the South LakeUnion planning area and Denny Triangle areas.

- If a capacity improvement were to be made at the Mercer/Fairview intersection, the eastbound traffic choke point would move west to the Mercer/Dexter intersection. This would alleviate traffic congestion within the South Lake Union planning area, but not allow an appreciable increase in peak hour eastbound traffic volumes from west of Aurora Avenue (via Mercer Street).

- Because of the congestion to I-5 north from the

Denny corridor for traffic from the Denny Regrade area (see Global Considerations below), an improved connection from eastbound Broad Street to eastbound Mercer would be desirable.

- Westbound traffic flow and operations from the I-5 off-ramps to the Valley/Broad Street corridor could be improved by reconstruction of the Valley/Fairview intersection to improve the majority westbound traffic movement from Fairview Avenue to Valley Street, together with lane sign- irrgimprovements.

. Westlake traffic flow from Valley Street to Seattle Center and the lower/upper Queen Anne communities *could* be *vastly* improved by a straight-through connection across or under Aurora Avenue from Valley Street to Roy Street.

. The high traffic volumes on both Mercer and Valley Streets create a great impediment to north-south bicycle and pedestrian access to South Lake Union Park and the Marine Heritage Center; centered along Terry Avenue. Park parking is anticipated to expand on the south side of Valley Avenue. Therefore, improvements to facilitate north-south pedestrian circulation across Mercer and Valley Streets is highly desirable.

"Global" Traffic Considerations

Traffic using the Mercer/Valley corridor is significantly influenced by the I-5 ramp configurations at Stewart/Olive/Howell. From I-5 north, traffic flows into the Denny Triangle Regrade areas via the reversible roadway; but the Olive on-ramp is a poor complement to the I-5 northbound mainline roadway. Over the course of a whole weekday, inbound flow from I-5 north via Stewart totals 19,300 vehicles, versus only 9,300 in the outbound (return) direction The majority of this traffic imbalance shifts to the Mercer corridor. Consequently, eastbound traffic flow in the Mercer/Valley corridor is much higher than westbound traffic flow.

Currently the Mercer on-ramps to I-5 are relatively tie-flowing east of Fairview, except when accident situations cause either direction of I-5 to, fully congest. Northbound traffic volumes on I-5 northbound capacity north of the CBD is the section of I-5 between Mercer and SR-520. The flow capacity of this segment of I-5 is reduced by the well-known "Mercer/Roanoke weave". If the traffic "weave" between the I-5 mainline left-side Mercer on-ramp and the SR-520 off-ramp could be resolved, I-5 may be able to permanently accommodate the northbound traffic "feed" from the Mercer Street corridor, or any improvements thereof. This issue should be included in the TransLake Study that is now getting underway under direction of the WSDOT.

The *Howell/Yale intersection is a major point of congestion* for traffic approaching the I-5 southbound on-ramp and the I-5 northbound on-ramp to the reversible roadway via Howell street and Yale Avenue. Denny Way,– the only parallel of I-5 access alternative to the Mercer/Valley corridor – is highly congested. Any further studies of the Mercer/Valley corridor should also include the Denny Way corridor, and the I-5 Stewart/Howell/Olive I-5 access system.

Another not quite so apparent global issue for the Mercer/Valley corridor is access to the Alaskan Way Viaduct from the Seattle Center/QueenAnne area, and access to I-5 and 1-90 from the Alaskan Way Viaduct. The 1,985 South Lake Union Land Use and Transportation Plan offered some suggestions that should be revisited, The crossovers between the Alaskan Way Viaduct and I-5 at Royal Brougham and Spokane Streets should be given priority attention in the North Duwamish Transportation Study that is (currently underway?) through joint sponsorship of the City of Seattle and the Port of Seatde.

Part of the Bay Freeway paradigm has been to improve the connection between Aurora Avenue and I-5 via the Mercer corridor. From *the north on* Aurora Avenue, there is a crossover opportunity in the N. 45th/50th Street corridor. South of N.40th Street there is no further southbound traffic access to Aurora Avenue that would desire crossover at Mercer Street. North of the Royal Brougham/1st Avenue ramps to the Alaskan Way Viaduct, the only other access to Aurora Avenue (via the Broad Street tunnel) is from Western Avenue immediately west of the tunnel. Any traffic destined to I-5 at this access point could alternatively use Broad Street, ifa better connection from Broad Street and Elliott Avenue already exists. However, an improvement of the southbound traffic movement from Elliott Avenue to the Alaskan Way Viaduct is desirable.